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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
AFTERGUT, JEFF H	

ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/820,573	BRUYERE, ALAIN	
	Examiner	Art Unit	
	Jeff H. Aftergut	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) *20-39* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-8 and 13-19* is/are rejected.

7)☒ Claim(s) *4 and 9-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6-30-04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Election/Restrictions

1. Applicant's election of Group I, claims 1-19 in the reply filed on 10-24-05 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Claims 20-39 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10-24-05.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ebert et al in view of Tam.

Ebert et al suggested that those skilled in the art would have formed a multidirectional fibrous reinforcement designed to be a porous perform for producing a part made of composite material which included the step of depositing at least one reinforcing thread in at least two successive layers on a support surface by tow placement methods (paragraph [0028]). The reference clearly suggested that the perform was in the form of a grid (an open perform) which included the step of

depositing the fibers with a fiber tow placement operation. the reference expressly stated that rather than having to impregnate the perform with resin one skilled in the art would have known to incorporate thermoplastic fibers within the reinforcing fibers which acted as a resin in the perform during processing, see paragraph [0030]. The reference failed to teach that fiber tow placement would have included the step of pressing the reinforcing thread against the support surface during the depositing in a manner to exert a pressure substantially perpendicular to the support surface where the thread was deposited and that the thermoplastic binder fibers would have been used to bond the fibers together as well as bond the intersecting tows together.

However, in fiber placement and in particular fiber tow placement, it was known to associate a pressing member with the tow placement device which pressed the tow against the surface it was being applied against in a manner such that the forced applied to the tow was perpendicular to the surface with the compaction roller 30 (see Figure2 for example) and wherein the matrix associated with the fiber tow was a thermoplastic material which was melted during the tow placement in order to secure the tow in place during processing as evidenced by Tam. Tam suggested that the previously applied layers would have been preheated with torch 20 and that the thermoplastic coated tow itself would have been preheated prior to application with the use of heating source 23 prior to application of the two upon the surface with shoe 26 which was heated and compaction roller 30. It would have been understood by those skilled in the art at the time the invention was made that the thermoplastic fibers in Ebert would have been melted in such processing for tow placement and ensured that the

reinforcing tow was disposed in the desired location of the perform when performing tow placement in accordance with the typical processing as envisioned by Tam. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a tow placement device like that of Tam in the process of making a perform as taught by Ebert as such would have provided one with a perform which was stabilized in shape.

With regard to claim 3, note that the reference taught that a thermoplastic fiber binder would have been associated with the reinforcing fibers in the processing. Regarding claim 13, note that the reference suggested that one skilled in the art would have incorporated a binder thread in the operation and the wrapping of the tow with the fiber of thermoplastic is taken as a means for associating the thermoplastic fiber with the reinforcement. With respect to claim 14, note that the references suggested the inclusion of a thermoplastic resin therein which resin is known to have been pulverizable and that claim 14 does not require any further processing steps therein just that the resin be pulverizable. Regarding claim 15, note that the reference to Tam suggested that the binder was impregnated within the fibers and that the incorporation of the thermoplastic fiber within the reinforcing fibers produced a hybrid thermoplastic reinforcing material. Regarding claim 16, note that the reference to Tam included a cutting means and that one skilled in the art would have understood that the reinforcing thread would have been cut at the ends of the grid in Ebert (and thus were discontinuous). Regarding claim 17, one skilled in the art would have understood that the support surface shape was a function of the desired shape of the perform and that

the use of a shaped surface was known as evidenced by Tam (the mandrel of Figure 1). Regarding claims 18 and 19, the reference to Tam suggested exertion of pressure upon the tow and the reference clearly suggested application of heat within the specified range (note that the polymers of Ebert would not have been melted if they were not heated to within the specified ranges defined). The specific amount of pressure applied would have been determined through routine experimentation.

5. Claims 2 and 5-7 are is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 4 further taken with Zsolnay et al.

For thermoplastic fiber reinforced composite tow placement, the reference to Tam suggested one would have supplied to tow to the device wherein the same was preheated and the surface was preheated and the tow applied to the surface. The reference failed to expressly state that one skilled in the art would have applied to tow with a compaction device which was moved at the same time that the tow was moved in such a manner that the tow was under no tension during the application of the tow on the substrate. However, the reference to Zsolnay suggested a precision manner for fiber placement which included a means for gathering the fiber tows on the placement roller followed by a means for depositing the fibers upon the surface. The processing included gathering the fiber tows on a application roller prior to translation of the roller along the application surface whereby the fiber tows would have been under little or no tension during application as the fibers were moved along the surface because they were separately gathered in an initial step and no additional gathering was performed during application of the tows to the surface (gathering is the pulling of the tows which would

have tensioned the same). The pressing head of Zsolnay included a pressing roll with grooves therein as well as a finger means for retaining the tows against the pressing roll, see various Finger mechanisms as depicted in Figures 10-12 as well as the use of guide grooves as depicted in Figure 15. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the pressing roll of Zsolnay in the operation of making a composite perform by fiber tow placement wherein the placement head of Zsolnay provided one with superior control over the placement of the tows on the surface with the use of the grooves and fingers as defined therein in the process of making the perform as set forth above in paragraph 4.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 4 further taken with either one of Cano et al (the article entitled "Studies on Automated Manufacturing of High Performance Composites") or Muzzy et al.

The reference to Tam suggested that those skilled in the art would have applied a thermoplastic impregnated fiber on the support, but it failed to teach that the tow was coated with a powder material. It should be noted that the reference to Ebert clearly suggested that those skilled in the art would have incorporated a thermoplastic fiber material within the tow, however the fiber material is not a powder. However the incorporation of a powder for a tow as the resin therein which tow was useful in fiber placement was known as evidenced by Muzzy et al or Cano et al (the article entitled "Studies on Automated Manufacturing of High Performance Composites"). Both Muzzy and Cano suggested that it was known at the time the invention was made to employ a

powder coated fiber tow for fiber placement operations wherein the resin employed was in powder form and was a thermoplastic material. Clearly, it would have been understood for tow placement in the manufacture of a perform that a thermoplastic powder coated tow would have been an art recognized equivalent to the thermoplastic fiber in the tow as suggested was used by Ebert. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the powder coated tows of either one of Muzzy et al or Cano et al in the operation for forming a resin fiber perform as set forth above in paragraph 4 as the use of the powder coated tow would have been understood to have been an art recognized equivalent to the thermoplastic impregnated fibers.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 4 further taken with Curzio or U.K. 2,105,247.

The reference to Ebert clearly suggested the incorporation of a thermoplastic fiber within the reinforcing fibers of the tow which was applied to the support surface and on top of other applied layers in the manufacture of the perform, however it failed to expressly state that the fibers of thermoplastic material were wrapped about the core of reinforcing fibers. It should be noted that such was well known in composite article manufacture. To evidence the same, the references to Curzio or U.K. '247 are cited. The references both suggested that in the manufacture of a composite fiber reinforced thermoplastic article one skilled in the art would have provided a core of reinforcing fibers followed by wrapping the same with a thermoplastic filament to retain the same.

The references both suggest that the so formed tow was useful in the manufacture of composite articles wherein one applied heat and pressure to the same in order to wet out the reinforcing fibers with the thermoplastic fiber therein to form a matrix for the reinforcing fiber. As it would have been a suitable means for retaining the reinforcing fibers in the fiber tow as well as provided a suitable resin material therein, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the techniques of either one of Curzio or U.K. '247 to provide the reinforcing fibers with a thermoplastic fiber in the manufacture of a composite perform assembly as set forth above in paragraph 4 wherein the perform was formed from reinforcing fibers and thermoplastic fibers.

Allowable Subject Matter

8. Claims 4 and 9-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. None of the prior art of record taught the application of a powder upon the support surface either prior to application of reinforcement of simultaneous therewith. Additionally the prior art failed to teach the application of a hot melt prior to deposition of the reinforcement on the support surface as claimed herein.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Borbone et al suggested a process for forming a perform with fiber placement processing. Murphy taught that it was known to incorporate a thermoplastic fiber in a perform for retaining the perform in the desired deposition.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 571-272-1212. The examiner can normally be reached on Monday-Friday 7:15-345 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA

December 2, 2005